

IN THE CLAIMS:

1. (currently amended) A current sensor for an apparatus, said current sensor comprising:

a conductor comprising a longitudinal axis, said conductor further comprises an aperture therethrough, said aperture comprising a length substantially aligned with respect to said longitudinal axis, said aperture comprising a first width aligned perpendicularly with respect to said longitudinal axis wherein length is greater than said width, said conductor further comprises a first portion and a second portion adjacent said aperture, said first and second portions comprising a cross section comprising a second width and a height, the second width being substantially greater than the height; and

a plurality of Hall effect devices inserted at least partially within said aperture, and said plurality of Hall effect devices aligned substantially perpendicularly to a the longitudinal axis of the conductor, and in the same plane as the first and second conductor portions on either side of the aperture,

wherein said conductor is configured to generate a magnetic field having pre-determined lines of force when an electrical current is flowing through said first and second conductor portions, each said Hall effect device configured to generate a first an output based on said generated magnetic field and a second output based on an ambient magnetic field, said current sensor configured to combine the first output with the second output outputs of each said Hall effect device such that the second output based on the ambient magnetic field is reduced.

2. (original) An apparatus in accordance with Claim 1 wherein said apparatus comprises a residential electricity meter.

3. (previously presented) A current sensor in accordance with Claim 1 wherein said generated magnetic field has a pre-determined spatial dependence.

4-5. (canceled)

6. (original) A sensor in accordance with Claim 1 wherein said Hall effect device output comprises a non-linear component.

7. (previously presented) A sensor in accordance with Claim 1 wherein said plurality of Hall effect devices are separated by a pre-determined distance.

8. (canceled)

9. (withdrawn) A sensor in accordance with Claim 1 wherein said magnetic field comprises at least two magnetic field components having the same direction.

10. (currently amended) A current sensor for an apparatus comprising:

a conductor comprising a longitudinal axis, said conductor further comprising an aperture therethrough, said aperture comprising a length substantially aligned with respect to said longitudinal axis, said aperture comprising a first width aligned perpendicularly with respect to said longitudinal axis wherein said length is greater than said first width, said conductor comprises a first and a second portion, said first and second portions comprising a cross section comprising a second width and a height, the second width being greater than the height; and

a plurality of Hall effect devices inserted at least partially within said aperture, and said plurality of Hall effect devices aligned substantially perpendicularly to a the longitudinal axis of the conductor, and in the same plane as the first and second conductor portions on either side of the aperture,

wherein said conductor is configured to generate a magnetic field comprising at least a first magnetic field component having a first direction and a second magnetic field component having a second direction different from said first direction, and ~~having pre-determined lines of force~~ when an electrical current is flowing through said conductor,

each said Hall effect device configured to detect said generated magnetic field and generate ~~a first an output based on said generated magnetic field and to detect an ambient magnetic field and generate a second output~~, said current sensor configured to combine said ~~first output and said second output~~ the outputs of each said Hall effect device such that said ~~second the output based on the ambient magnetic field~~ is reduced.

11. (currently amended) A residential electricity meter comprising a voltage sensor and a current sensor, said current sensor comprising:

a conductor comprising a longitudinal axis, said conductor further comprising an aperture therethrough, said aperture comprising a length substantially aligned with respect to said longitudinal axis, and said aperture comprising a first width aligned perpendicularly with respect to said longitudinal axis wherein said length is greater than said first width, said conductor further comprises a first and a second portion, said first and second portions comprising a cross section comprising a second width and a height, the second width being greater than the height; and

a ~~[[plurality]]~~ pair of Hall effect devices inserted at least partially within said aperture, and said pair of Hall effect devices aligned substantially perpendicularly to a the longitudinal axis of the conductor, and in the same plane as the first and second conductor portions on either side of the aperture,

wherein said conductor is configured to generate a magnetic field ~~having predetermined lines of force~~ when an electrical current is flowing through said conductor,

each said Hall effect device configured to detect said generated magnetic field and generate ~~a first~~ an output based on said generated magnetic field and ~~to detect~~ an ambient magnetic field and ~~generate a second output~~, said current sensor configured to combine ~~said first output and said second output~~ the outputs of each said Hall effect device such that ~~said second~~ the output based on the ambient magnetic field is reduced.

12. (original) An electricity meter in accordance with Claim 11 wherein said electricity meter comprises a residential electricity meter.

13. (previously presented) An electricity meter in accordance with Claim 11 wherein said generated magnetic field has a pre-determined spatial dependence.

14-15. (canceled)

16. (original) An electricity meter in accordance with Claim 11 wherein said Hall effect device output comprises a non-linear component.

17. (currently amended) An electricity meter in accordance with Claim 11 wherein said ~~[[plurality]]~~ pair of Hall effect devices are each separated by a pre-determined distance.

18. (canceled)

19. (withdrawn) An electricity meter in accordance with Claim 11 wherein said magnetic field comprises at least two magnetic field components having the same direction.

20. (currently amended) A residential electricity meter comprising a voltage sensor and a current sensor, said current sensor comprising:

a conductor comprising a longitudinal axis, said conductor further comprising an aperture therethrough, said aperture comprising a length substantially aligned with respect to said longitudinal axis, and said aperture comprising a width aligned perpendicularly with respect to said longitudinal axis, said length is greater than said width, said conductor comprises a first and a second portion, said first and second portions comprising a cross section comprising a length and the height, the length being greater than the height; and

a plurality of Hall effect devices inserted at least partially within said aperture, and said plurality of Hall effect devices aligned substantially perpendicularly to a the longitudinal axis of the conductor, and in the same plane as the first and second conductor portions on either side of the aperture,

wherein said conductor is configured to generate a magnetic field at least a first direction and a second magnetic field component having a second direction different from said first direction, and pre-determined lines of force when an electrical current is flowing through said conductor;

each said Hall effect device configured to detect said generated magnetic field and generate ~~a first~~ an output based on said generated magnetic field and to detect an ambient magnetic field ~~and generate a second output,~~ said current sensor configured to combine ~~said first output and said second output~~ the outputs of each said Hall effect device such that ~~said second~~ the output based on the ambient magnetic field is reduced.

21. (withdrawn) A method for sensing voltage and current in a residence, said method comprising:

providing an electricity meter comprising:

a voltage sensor; and

a current sensor, wherein the current sensor comprises a conductor comprising an aperture therethrough and a plurality of Hall effect devices inserted at least partially within the aperture, wherein the conductor is configured to generate a magnetic field having a pre-determined shape, each Hall effect device is configured to detect the pre-determined shape and generate an output, and each said Hall effect device configured to be insensitive to magnetic fields having shapes other than the pre-determined shape.

22. (withdrawn) A method in accordance with Claim 21 wherein providing an electricity meter comprises providing a residential electricity meter.

23. (withdrawn) A method in accordance with Claim 21 further comprising providing a conductor configured to generate a magnetic field having a pre-determined spatial dependence.

24. (withdrawn) A method in accordance with Claim 21 further comprising providing a Hall effect device output comprising a non-linear component.

25. (canceled)

26. (withdrawn) A method in accordance with Claim 21 wherein said plurality of Hall effect devices are each separated by a pre-determined distance.

27. (canceled)

28. (withdrawn) A method in accordance with Claim 21 further comprising providing a conductor configured to generate a magnetic field comprising at least a first magnetic field component having a first direction and a second magnetic field component having a second direction the same as the first direction.

29. (withdrawn) A method for sensing voltage and current in a residence, said method comprising:

providing a residential electricity meter comprising:

a voltage sensor; and

a current sensor, said current sensor comprising a conductor comprising an aperture therethrough and a plurality of Hall effect devices inserted at least partially within said aperture and aligned substantially perpendicularly to a longitudinal axis of the conductor and in the same plane as the conductor portions on either side of the aperture, said conductor is configured to generate a magnetic field comprising at least a first magnetic field component having a first direction and a second magnetic field component having a second direction different from said first direction, and a pre-determined shape, each said Hall effect device configured to detect said pre-determined shape and generate an output, and each said Hall effect device configured to be insensitive to magnetic fields having shapes other than the pre-determined shape.

30. (currently amended) An apparatus in accordance with Claim 1 wherein said current sensor is configured to combine ~~said first output~~ the ambient magnetic field and ~~said second output~~ the ambient magnetic field using subtraction.

31. (currently amended) An apparatus in accordance with Claim 1 wherein said current sensor is configured to combine ~~said first output~~ said generated magnetic field and ~~said second output~~ the ambient magnetic field such that ~~said first output~~ said generated magnetic field is added and ~~said second output~~ the ambient magnetic field is subtracted.